

PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Process for the Preparation of a Printing Plate

We, KALLE ARTIENGESSELLSCHAFT, a Body Corporate organised according to the Laws of Germany, of 190—196 Rheingaustrasse, Wiesbaden-Biebrich, Federal Republic of Germany, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed to be particularly described in and by the following statement:—

The present invention is concerned with a process for the preparation of a printing plate from a presensitized material comprising a metal support, preferably of aluminium or zinc, which carries a light-sensitive layer containing as the light-sensitive substance an ester or an amide of an *o*-naphthoquinone diazide sulphonic acid or an *o*-naphthoquinone diazide carboxylic acid, and preferably, although not necessarily, an alkali-soluble resin.

When such material is used for the preparation of a printing plate, its light-sensitive layer is exposed to actinic radiation under an original and the exposed areas of the layer are then removed from the support by treatment with a developer solution. Normally, an alkaline solution is used for development. The developed plate is normally then inked up with printing ink so that any faults on the plate will immediately become visible. During inking, only the areas of the metal support which are still covered by the layer accept printing ink.

The resulting plate in most cases requires correction because in the areas corresponding to the margins of the original and sometimes also in the areas making up the background of the printing plate, residues of the light-sensitive layer are retained which accept printing ink and therefore cause a smudgy background upon printing. Alkaline or acid aqueous solutions, which sometimes contain

a dissolved or emulsified organic solvent, are usually used for correction.

Printing plates having a clean background are sometimes further processed before they are used for printing, either by treatment with reinforcing lacquer, for example a novolak lacquer, to strengthen the image areas, by treatment of the image background with an acid to render it more hydrophilic, or by coating the printing plate with a protective layer when printing is to be deferred.

The above-described known process yields offset printing plates from which relatively long runs of prints can be obtained. Nevertheless, there is a demand for a further increase of the number of satisfactory prints which can be made. Furthermore, printing plates prepared by the known process cannot be used for printing with the corrosive printing inks generally used when it is desired to print on plastics surfaces.

The invention provides a process for the preparation of a printing plate from presensitized material comprising a metal support carrying a light-sensitive layer which contains, as the light sensitive substance, an ester or an amide of an *o*-naphthoquinone-diazide sulphonic acid or an *o*-naphthoquinone-diazide-carboxylic acid, which comprises exposing the light-sensitive layer to actinic light under an original, removing the exposed areas of the layer from the support by treatment with a developer, a clean, ink-repelling image background being produced either as the result of development or by a subsequent correcting treatment, thereafter heating the image areas of the printing plate material to a temperature of at least 180°C in the presence of a novolak and/or a resole resin, which has been incorporated in the light-sensitive layer or has been applied as a solution or emulsion to the coated surface of the material prior to heat-

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ing, and finally subjecting the image background to a cleaning treatment to remove contamination thereof produced by the heat treatment. A similar process involving pre-sensitized material having a negative working quinone diazide in the light-sensitive layer is described and claimed in copending Application No. 46773/66, Serial No. 1,151,199.

The resoles to be used in the process according to the invention are meltable condensation products of an aldehyde, in particular formaldehyde, with a phenol which are soluble in organic solvents and in aqueous alkaline solutions and can be hardened by subjection to heat. The novolake are also condensation products of an aldehyde, particularly formaldehyde, with a phenol, but they differ from the resoles in that they cannot be hardened by exposure to heat and accordingly remain thermoplastic and soluble after heating. Mixtures of novolaks and resoles may, of course, be used. Novolaks, and particularly those obtained by condensation of *o*-cresol with formaldehyde, are preferred since when these are used the contamination of the image background caused by heating the developed material—which contamination will be discussed below—can be removed with relatively weak cleaning agents. Novolaks having a melting range of 70 and 130°C are preferably used.

The novolaks and resoles are well known types of phenol resins. Novolaks are formed by condensation of a phenol with formaldehyde in an acid condensation medium, using less than one equivalent of aldehyde per equivalent of phenol. Resoles are obtained by condensation of a phenol with formaldehyde in an alkaline reaction medium, using, in most cases, more than one equivalent of aldehyde per equivalent of phenol, although a resin of the phenol type is also obtained when less aldehyde is used, provided the condensation is performed in an alkaline condensation medium. Suitable phenols for the preparation of the novolaks and the resoles are, besides phenol itself, its homologues, in particular the cresols, xylenols and other alkyl phenols. The formaldehyde used is normally paraformaldehyde, but other aldehydes, e.g. acetaldehyde or furfural, are sometimes used in place of formaldehyde for the preparation of the resols and novolaks.

Novolaks and resoles are produced on an industrial scale and the novolaks and resoles used in the examples which follow are commercial products, viz. the novolaks "Alnovol 429 K" (Examples 1, 7 to 14, 19, 20, and 25 to 27), "Liacin O" (Example 2), "Bakelite-Harz 205" (Examples 3, 15 and 21), "Crayvallac 280" (Examples 4, 16 and 22), and "Duraz-Harz 175" (Examples 5, 17 and 23), and the resole "Bakelite-Harz 202" (Examples 6, 18 and 24). "Bakelite", "Alnovol",

"Durez" and "Liacin" are Registered Trade Marks.

As already noted, the presence of one of the above-mentioned resins during heating of the image areas may be achieved by incorporation of the resin in the light-sensitive layer during the preparation of the pre-sensitized material, and this is the preferred procedure. In this case, the amount of resin in the light-sensitive layer should range from 25% by weight to 2000% by weight of the weight of the light-sensitive substance. However, when the amount of resin is at least 100% by weight and not more than 600% by weight of the weight of the light-sensitive substance particularly good results are obtained.

Alternatively, the resin may be provided by coating the sensitized surface of the material with a solution or emulsion of the resin and then drying. This may be effected at any time prior to heating, but most advantageously the resin solution (lacquer) is applied by wiping to the plate after development of the exposed layer. When the light-sensitive layer contains a resole or a novolak, it may be given a surface coating of a solution of resole or novolak in order to increase the quantity of resin present during heating.

When a resin solution is used, the resin may be dissolved in an organic solvent which does not attack the light-sensitive layer and which is miscible with water in all proportions. Mixtures of such solvents which contain 40 to 80% by weight, based on the weight of the solution, of a polyhydric alcohol are preferred. Examples of suitable polyhydric alcohols are ethyleneglycol and glycerol.

The quantity of resin in the solution is preferably 3 to 20% by weight of the solution. Suitable lacquers are described in specification No. 1,022,243.

In some cases, the resin may be dissolved in a solvent having only limited solubility in water. Resin solutions of this type are preferably applied in the form of an emulsion in water, the aqueous phase of the emulsion containing a water soluble organic colloidal thickener. Emulsified resin solutions of this kind are described in Specification No. 967,593.

Examples of suitable light-sensitive substances for inclusion in the light-sensitive layer are to be found in Specification Nos. 699,412, 706,028, 739,654, 935,250, 935,452, 937,121, 937,123 and 951,929.

The concentration of light-sensitive substance in the coating solution applied to the support should range from 0.1 to 8%, preferably from 1 to 4%, by weight.

The support may be of aluminium, zinc or steel, or may be a bi- or tri-metal plate or foil, e.g. of chromium-copper, chromium-copper-aluminium, or chromium-copper-zinc. The support may be smooth or may have a

chemically, mechanically or electrolytically roughened surface.

The extent to which the heating temperature may exceed 180°C depends, inter alia, on the resin used and the temperature resistance of the support. When an aluminium support is used, heating is preferably effected at 200 to 250°C. Depending on the temperature used, the time of heating will generally range from 5 to 60 minutes. Longer periods of heating, e.g. twice as long, in general involve no serious disadvantages apart from waste of time. When the support is of stainless steel, far higher heating temperatures can be used, e.g. heating to 450 °C for 30 seconds. It will be appreciated that the temperature and time required are mutually dependent, i.e. at higher temperatures heating for a shorter time will be sufficient and vice versa. The temperature and time of heating must be such that the image areas undergo a change and the background of the image is at least partially covered with a contaminating layer which accepts printing ink during inking and would yield a completely or substantially soiled image background during printing. Unless the heating is so extensive that it is necessary to clean the plate to produce a clean ink-repelling image background before the plate can be used for printing, no substantial improvement of the printing plate is achieved. The contaminating layer which deposits on the image background when the printing plate material is heated is, as a rule, not discernible by the naked eye.

During heating, the colour of the developed printing image generally changes. This change of colour depends, inter alia, on the nature of the light-sensitive substance in the light-sensitive layer. The colour of the developed image may also be influenced considerably by a dyestuff present in the layer. Images which appear yellow when first developed may, for instance, change from yellow through pink to a deep brown when heated. The layer is, as a rule, no longer light-sensitive once it has been heated.

The layer should, after heating, be resistant to acids, even concentrated acids, and to practically all organic solvents. It should also be relatively resistant to dilute (0.5%) aqueous solutions of alkali metal hydroxides. The printing image is strengthened to such an extent by the heat treatment that even under adverse printing conditions the number of prints which can be obtained is substantially increased.

The cleaning medium used after the heat treatment is in most cases an aqueous, weakly alkaline solution. In some cases, strongly alkaline solutions and in many cases even acid solutions may be used. For practical purposes, solutions having as weak an action as possible are preferred. The cleaning agent may also contain a dissolved or emulsified

organic solvent. It will be appreciated that the contaminating layer will adhere to the metallic support to an extent which varies from case to case, but it has been found that the contamination can be completely removed by wiping the surface of the printing plate with an appropriately chosen cleaning agent while the printing image, which is also wiped over, remains on the support.

In many cases it is advantageous to treat the material with an aqueous solution of acid, e.g. with a 0.5–3% aqueous solution of phosphoric acid, between the first formation of a clean, ink-repelling image background and the heating step. By this treatment, the metallic image background is rendered more hydrophilic and its adherence to the layer which deposits on it during heating is reduced.

Printing plates made by the process according to the invention may be used, among other purposes, for web offset printing, in certain etching processes for relief and intaglio printing, and in the printing of plastics films with printing inks containing solvents of high dissolving power.

While the heating process initially renders the plate so defective that it cannot be used for printing because the prints obtained would be hazy, streaky and spotted, and is therefore apparently irreparably spoiled, subsequent cleaning nevertheless yields a printing plate of exceptionally high quality.

EXAMPLES

In the following examples, parts by volume are in ccs and parts by weight are in grammes. Percentages are by weight unless otherwise stated. In most of the examples, no correction of the printing plate was made between development and heating, because the image background was so clean after the developing step that no correction was necessary.

In order to save time and material in the printing tests, in most of the examples a printing machine was used which exerted a relatively high stress on the printing plate.

EXAMPLE 1

A mechanically roughened aluminium foil was coated with a solution containing

1.5 parts by weight of the condensation product from 2,3,4-trihydroxy-benzophenone and naphthoquinone-(1,2)-diazide-(2)-5-sulphochloride (prepared as described in specification No. 739,654),

0.8 parts by weight of the condensation product from 1 mol of 2,2'-dihydroxy-1,1'-dinaphthylmethane and 2 moles of naphthoquinone-1,2-diazide-(2)-5-sulphochloride (prepared as described in specification No. 706,028, Example 6),

6 parts by weight of a novolak prepared by condensing *o*-cresol and form-

aldehyde and having a melting range of 108—118°C, and

120 parts by volume of ethyleneglycol monomethylether,

5 using a rotating disc for whirling off excess quantities of the applied solution. The foil was then dried first in a current of warm air and then for 2 minutes to 100°C.

10 The presensitized material so prepared can be stored for several months. However, it was exposed shortly after its preparation under a diapositive for 1 minute, using a carbon arc lamp of 18 amperes at a distance of 70 cm. The exposed layer was developed by 15 wiping over with a cotton wool pad soaked in a 5% aqueous solution of trisodium phosphate, then rinsed with water, and treated with a 2% aqueous solution of phosphoric acid. During development, a bright yellow 20 positive image became visible on a metallic background.

25 The dried printing plate was then baked for 20 minutes in an oven heated to 230°C. During making, the colour of the image on the printing plate changed from greenish-yellow through pink to yellowish-brown. As the result of heating in the oven, the image 30 constituted by the remaining portions of the light-sensitive layer became hardened, but the image background acquired a contaminating layer. After the plate had cooled, it was repeatedly wiped over with a 5% aqueous solution of trisodium phosphate, which freed the 35 image background from this contaminating layer, the hardened image being unaffected. The foil was then immersed in a 2% aqueous solution of phosphoric acid and then inked up with greasy printing ink, using a pad of cotton wool.

40 The resulting printing plate was used in an offset printing machine and at least 100,000 prints were prepared before any wear of the plate could be distinguished.

45 A second printing plate was prepared in the same manner, except that baking and subsequent cleaning of the developed plate were omitted. The resulting printing plate showed signs of wear after the preparation of 30,000 prints on the same offset printing machine.

EXAMPLE 2

50 An electrolytically roughened aluminium foil was coated with a solution containing:—

55 1.5 parts by weight of the condensation product from 1 mol of phloroglucinol and 1 mol of naphthoquinone-(1,2)-diazide-(2)-5-sulphochloride (prepared as described in Example 1 of specification No. 937,123),

60 6 parts by weight of a novolak resin having a melting range from 100 to 120°C, and

120 parts by volume of ethyleneglycol monomethylether.

The foil was then dried in a current of warm air. 65

Although the resulting material could be stored for many months, it was exposed under a diapositive shortly after its preparation. It was then developed with a 5% aqueous solution of trisodium phosphate, rinsed with water, and dried at 100°C. The resulting printing 70 plate exhibited an image on a clean, bright metallic background.

75 The foil was then baked for 20 minutes in an oven heated to 230°C. After baking, the image background was completely covered by a contaminating layer. After the plate had cooled, it was wiped over with a 5% aqueous solution of hydrofluoric acid, which removed the contamination of the image background 80 while the image itself remained unaffected. After a water rinse, the plate was ready for printing.

85 50,000 satisfactory prints were made from the printing plate on a printing machine. A printing plate prepared in a similar manner, but without baking and subsequent cleaning, yielded only 25,000 satisfactory prints on the same printing machine.

EXAMPLE 3

90 The roughened surface of an aluminium foil was coated with a solution containing:

2 parts by weight of the condensation product from 1 mol of 2,3,4-tri-hydroxy-benzotropolone and 1 mol 95 of naphthoquinone-(1,2)-diazide-(2)-4-sulphochloride (prepared as described in Example 3 of specification No. 937,121),

5 parts by weight of a novolak resin 100 having a melting range from 95—100°C, and

120 parts by volume of ethyleneglycol monomethylether.

105 A printing plate was prepared as described in Example 1, using a 1.5% aqueous solution of trisodium phosphate for development, baking the developed printing plate for 20 minutes in an oven at 240°C, and subsequently cleaning it with a 3% aqueous 110 solution of hydrofluoric acid.

60,000 satisfactory prints were obtained on a printing machine from the resulting plate prepared in this manner. A printing plate 115 which had been prepared in the same manner, but without baking and subsequent cleaning yielded only 15,000 satisfactory prints on the same machine.

EXAMPLE 4

120 The following solution was applied to the mechanically roughened surface of an aluminium foil:

2 parts by weight of the condensation product from 1,2,3-trihydroxy-anthraquinone and naphthoquinone- 125 (1,2)-diazide-(1)-6-sulphochloride (pre-

pared as described in Example 13 of specification No. 941,914),

5 parts by weight of a novolak of cresol and formaldehyde having a melting range from 90—105°C, and

110 parts by volume of ethyleneglycol monomethylether.

A printing plate was prepared in a manner similar to that described in Example 1, using a 2% aqueous solution of trisodium phosphate for development, baking the developed foil for 20 minutes at 240°C, and then cleaning it with a 5% aqueous solution of trisodium phosphate.

60,000 satisfactory prints were made with the resulting printing plate, while only 6,000 satisfactory prints were obtained on the same machine from a printing plate which had been prepared in a similar manner, but without baking and subsequent cleaning.

EXAMPLE 5

A printing plate was prepared by coating the electrolytically roughened surface of an aluminium foil with a solution containing:—

2 parts by weight of the condensation product from 1 mol of 2,2',4,4'-tetrahydroxy-diphenyl- and 3 moles of naphthoquinone - (1,2) - diazide - (2)-4-sulphochloride (prepared as described in specification No. 935,452),

5 parts by weight of a novolak resin having a melting range of 60—70°C, and

100 parts by volume of ethyleneglycol monomethylether.

A 5% aqueous solution of trisodium phosphate for development, the developed foil was baked for 20 minutes to 230°C, and, after cooling, treated with a 5% aqueous solution of trisodium phosphate.

60,000 satisfactory prints were made from the resulting printing plate, whereas a printing plate prepared in the same manner, but without baking, yielded only 25,000 satisfactory prints, on the same printing machine.

EXAMPLE 6

A printing plate was prepared by applying the following solution to the mechanically roughened surface of an aluminium foil:

2 parts by weight of the condensation product from 1 mol of 2,3,4-trihydroxy-benzophenone and 1 mol of naphthoquinone-(1,2)-diazide-(2)-5-sulphochloride (prepared as described in specification No. 739,654),

5 parts by weight of a resole resin having a melting range of 90—95°C, and

100 parts by volume of ethyleneglycol monomethylether,

developing the exposed layer with a 5% aqueous solution of trisodium phosphate, baking the developed foil for 20 minutes at 230°C, and removing the contamination from

the image background by means of a 5% aqueous solution of trisodium phosphate.

40,000 satisfactory prints were made from the resulting printing plate, whereas only 20,000 satisfactory prints were obtained from a printing plate prepared in the same manner but without baking.

EXAMPLE 7

A printing plate was prepared by applying the following solution to the mechanically roughened surface of an aluminium foil:

2 parts by weight of the condensation product from 1 mol of 2,3,4-trihydroxy-benzophenone and 1 mol of naphthoquinone-(1,2)-diazide-(2)-5-sulphochloride,

5 parts by weight of an *o*-cresol/formaldehyde novolak resin having a melting range from 108—118°C, and

140 parts by volume of ethyleneglycol monomethylether.

The coated foil was dried, exposed under an original, developed with a 5% aqueous solution of trisodium phosphate solution, rendered hydrophilic by treatment with an aqueous solution of phosphoric acid, and dried.

The printing plate so prepared was cut into two halves, and one half was coated with a lacquer having the following composition:—

50 parts by weight of cyclohexanone,

50 parts by weight of glycerol,

5 parts by weight of the novolak resin mentioned above, and

0.5 part by weight of crystal violet (Schultz, Farbstofftabellen, No. 785, page 330).

The novolak resin contained in the lacquer adhered strongly to the image areas on the surface of the aluminium foil, whereas it did not adhere to the metallic non-image areas.

Subsequently, the lacquered half of the printing plate was washed with water, dried, and baked for 20 minutes at 230°C, whereby a contaminating layer was produced on the image background which was removed by treatment with a 5% aqueous solution of trisodium phosphate.

The other half of the printing plate was not lacquered and not baked.

The two halves of the printing plate were then used for printing, the lacquered half yielding 40,000 flawless prints, while the unlacquered and unbaked half yield only 30,000 satisfactory prints.

EXAMPLE 8

A solution containing

2 parts by weight of the condensation product from 1 mol of 2,3,4-trihydroxy-benzophenone and 1 mol of naphthoquinone-(1,2)-diazide-(2)-5-sulphochloride, and

120 parts by volume of ethyleneglycol monomethylether was coated onto the mechanically roughed surface of an aluminium foil and dried. A printing plate was prepared in the manner described in Example 1, using a 2% aqueous solution of trisodium phosphate for development. The plate was cut into two halves. One half was coated with the novolak resin solution mentioned in Example 7. The resin adhered strongly to the image areas but did not adhere to the image background. After rinsing with water, the lacquered half of the plate was dried and baked for 20 minutes to 240°C. The contamination of the image background caused by baking was removed by treatment with trisodium phosphate solution. The unlacquered half of the plate was subjected to the same baking treatment. The lacquered half of the plate yielded 40,000 satisfactory prints, while the unlacquered half yielded only 5000 satisfactory prints.

EXAMPLE 9

A light-sensitive material prepared as described in Example 1 was exposed under an original, developed, and then wiped over with a 1% aqueous solution of phosphoric acid. For better visibility of the areas to be corrected, the plate was then inked up with black ink. The printing plate was dried, then corrected with a commercially available correcting agent for presensitized offset printing plates, and again treated with dilute phosphoric acid.

After the plate had been evenly gummed in order to protect the non-image areas and then dried, the ink was carefully removed with a commercially available washing solution containing petrol ether. The gum coating was removed by washing with water. The plate was then treated with a 1% aqueous solution of phosphoric acid and dried. Subsequently, it was baked in an oven for 20 minutes to 240°C. After cooling, the plate was further treated as in Example 1. The plate so prepared yielded substantially more prints than a plate which had been prepared in a similar manner, but had not been baked after removal of the gum coating.

EXAMPLES 10—12

Example 8 was repeated, with three modifications, using, without cutting the plate into halves but with coating of the plate with novolak resin followed by heating, substituting the light-sensitive substance of Example 8:—

10. the same amount of the β -naphtholester of 1,2-naphthoquinone-diazide-(1)-carboxylic acid-(3).
11. the same amount of the N-methylanilide of 2,1-naphthoquinone-diazide-(2)-sulphonic acid-(5), and
12. the same amount of the π -dodecylamide of 2,1-naphthoquinone-diazide-(2)-sulphonic acid-(5).

The printing plates obtained behaved similarly to that described in Example 8.

EXAMPLE 13

The process described in Example 1 was repeated for the preparation of printing plates suitable for multi-colour printing. Printing plates for red, yellow, blue, black and white were prepared by exposure under colour separation originals. The plates were baked for 15 minutes at 260°C. After the removal of contaminating layers, the resulting printing plates were used for printing on a cellulose triacetate film in a multi-colour printing machine, and 60,000 flawless colour prints could be produced.

Only 12,000 satisfactory prints could be made with printing plates which had been prepared in a similar manner but without baking.

EXAMPLE 14

An aluminium foil having a copper surface was coated, on the copper surface, with a solution of the composition described in Example 1.

After drying, the plate was exposed under a diapositive and developed with a 5% aqueous solution of trisodium phosphate. A weakly yellow image appeared on a copper-red background. The plate was wiped over with a 2.5% aqueous solution of phosphoric acid, dried, baked for 20 minutes at 240°C, cleaned with a 5% aqueous solution of trisodium phosphate, after cooling, rinsed with water, and then dried. The foil was then immersed in a ferric chloride solution of 35—41° Bé and left in this solution until the copper layer had been completely removed in the non-image areas and the bright aluminium underneath appeared. The image side of the plate was then rinsed with water, wiped over with a 2% aqueous solution of phosphoric acid, and dried. The printing plate was then baked and cleaned as described in Example 1. The printing plate so prepared yielded longer runs than a printing plate which had been prepared in the same way but without baking.

EXAMPLES 15—19

Printing plates were prepared in accordance with Examples 4 to 8, but the contaminating layer caused by baking was removed by means of a 3% aqueous solution of hydrofluoric acid instead of an aqueous trisodium phosphate solution. The results obtained were similar to those of Examples 4—8.

EXAMPLES 20—25

Printing plates were prepared in accordance with Examples 3 to 8, but the contaminating layer caused by baking was removed by means of a 5% aqueous solution of fluoroboric acid (HBF₃).

The results obtained were similar to those of Examples 3—8.

EXAMPLE 26

Plates of stainless steel were rubbed, on one surface, with pumice powder and water, then rinsed first with tap water and then with distilled water, and finally dried in a current of warm air. The surfaces cleaned in this manner were provided with a light-sensitive layer weighing 2 gms per sq. metre by the application of the coating solution described in Example 1. The resulting material was exposed and developed as in Example 1.

Of these plates,
one was baked for 10 minutes at 260°C,
one was baked for 5 minutes at 345°C,
and

one was baked for 2 minutes at 345°C.

The contaminating layer which deposited on the image background was removed, in all three cases, by treatment with a 5% aqueous solution of trisodium phosphate without the image being attacked by this cleaning agent.

The resistance of the image present on the plates was then tested with a strongly corrosive solution of the following composition:

30 parts by weight of ethyleneglycol monomethylether

30 3.15 parts by weight of potassium hydroxide

3.80 parts by weight of polyvinyl pyrrolidone

5.10 parts by weight of xylene, and

35 0.03 parts by weight of thymol blue.

The test was performed by applying drops of the corrosive solution to the image areas and leaving the drops for two minutes on the treated areas. Subsequently, the surface of the plate was wiped over and rubbed with a cotton wool pad moistened with water. In each of the three tests the image on the plate was not damaged by the corrosive solution. This showed that the printing plates are suitable for printing with corrosive printing inks.

Another of the developed plates was baked for 30 seconds in an oven heated to 460°C.

By the test method described above, it was established that this plate was also suitable for printing with corrosive printing inks. 50

WHAT WE CLAIM IS:—

1. A process for the preparation of a printing plate from presensitized material comprising a metal support carrying a light-sensitive layer which contains, as the light-sensitive substance, an ester or an amide of an *o*-naphthoquinone-diazide sulphonic acid or an *o*-naphthoquinone-diazide-carboxylic acid, which comprises exposing the light-sensitive layer to actinic light under an original, removing the exposed areas of the layer from the support by treatment with a developer, a clean, ink-repelling image background being produced either as the result of development or by a subsequent correcting treatment, thereafter heating the image areas of the printing plate material to a temperature of at least 180°C in the presence of a novolak and/or a resole resin, which has been incorporated in the light-sensitive layer or has been applied as a solution or emulsion to the coated surface of the material prior to heating, and finally subjecting the image background to a cleaning treatment to remove contamination thereof produced by the heat treatment. 55 60 65 70 75

2. A process according to Claim 1, in which the light-sensitive layer of the material contains a novolak obtained by condensation of *o*-cresol with formaldehyde. 80

3. A process according to Claim 1, in which the light-sensitive layer contains 100—600% by weight of novolak and/or resole based on the weight of the light-sensitive substance. 85

4. A process according to Claim 1, substantially as described herein with reference to any of the foregoing Examples.

5. A printing plate when prepared by the process claimed in any of the foregoing Claims. 90

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